Some moth conservation news updates

The following is a collection of news updates on some of the UK Biodiversity Action Plan Priority Species projects with which I am currently involved. These are projects for Butterfly Conservation and English Nature.

Barberry Carpet *Pareulype berberata* (D.& S.) – Conservation measures for this moth have been underway, on and off, ever since the 1970s, when the only population then known was threatened by road-building proposals. The moth has been the subject of a full English Nature Species Recovery Project since 1995. For a full account see the February 2000 issue of *British Wildlife* magazine (Vol. **11**, issue 3). Some of the major activities during 2000 have included monitoring all the known colonies, of which there are now eight with positive records from the last two years (mainly in Wiltshire, but one each in Gloucestershire and Dorset), searches of former sites (in Suffolk and Hampshire), site visits with landowners to discuss and arrange management of the Barberry hedges and bushes on which the caterpillars feed and searches for larvae in places where mature Barberry stands have been reported. This year we covered five more localities in Gloucestershire, one more in Wiltshire, two in Nottinghamshire, one in Northamptonshire, two in Oxfordshire, one in Bedfordshire, two in Essex, one in Sussex, one in Devon and one on the Isle of Wight. Unfortunately, all these larval searches for undiscovered colonies produced negative results except for the site in Wiltshire, showing that sites where Barberry still survives within the former range of the moth do not necessarily support the moth. We now have a substantial list of sites with Barberry that lack the moth, for whatever reason, and some have potential for establishment trials.

At the new Wiltshire site the translocation is planned of some bushes that were due to be uprooted during the winter of 1999/2000 to allow gravel extraction. We successfully obtained a postponement of the uprooting by one year to allow searches for larvae during both the generations in 2000. There were no previous records of the moth from the site and the bushes were only discovered in 1999. We found six larvae on the threatened bushes in the first generation (19 June) and nine larvae on 31 August. Because the bushes will definitely be removed during the winter of 2000/2001, the larvae were collected up for rearing and to provide a captive stock for use at the translocation site. Most interestingly, one of the first generation produced a parasitoid, a small black wasp with yellowish legs, as did three of the second-generation larvae. This is almost certainly the first documented case of parasitism of Barberry Carpet larvae, at least in recent decades. The wasps are now with specialists. It appears that those reared from the second generation are of an undescribed *Diadegma* species (Ichneumonidae: Campopleginae), very close to *D. armillatum* (Gravenhorst) (det. Klaus Horstmann, with thanks also to Mark Shaw). Although unnamed, this is probably a widespread parasitoid which attacks other species of moth larvae, based on the knowledge

of closely related species, some of which have been reared from other geometrid moths.

The establishment trial which has been running for the last two years in South Wiltshire has done very well this year, with good numbers of moths and larvae seen in the wild and colonisation of additional bushes. A new generation of larvae was present at the establishment trial in rural Northamptonshire, but none were found at the urban trial site just a few miles away, nor at the Lincolnshire trial site. Top-up releases of larvae took place at these sites. Two further establishment trials were initiated during the year, one in Suffolk and the other in Bedfordshire.

BLACK-VEINED MOTH *Siona lineata* (Scop.) – The four known populations of the Black-veined moth (all in Kent), are monitored annually. In 2000, the numbers of adult moths at one of these were the highest (with 1999) since counts began in the mid 1970s. This is due to the sympathetic conservation management the site has received in recent years, mostly by cutting and raking, with some grazing. Conversely, numbers on a National Nature Reserve are well below levels recorded over the same time period. This is also directly related to management practices. Key parts of the site have been overgrazed for several years running in spite of advice from the Species Recovery Project and the former site manager. This moth requires a calcareous grassland sward 10-25 cm in length with an abundance of herbs in almost every pace, such as Marjoram, a favourite larval foodplant. Also, the moth is particularly adversely affected by spring grazing, because this can lead to the removal of, or to a great reduction in, the herbs needed by the overwintered larvae for food prior to the spinning of cocoons in late April and early May. Major parts of the site have been overgrazed to the extent that larval food was diminished and grass cover for larvae and cocoons almost completely removed. Better management has been promised for the coming year. At the other two sites, both in private ownership, numbers have declined to some extent over the last two years, but the swards are now being managed sensitively, without grazing. Four other potential sites for the Black-veined Moth were searched during the year, with negative results.

Special news in 2000 is that another small site appears to have been colonised by moths from the above populations. This site has been inspected almost annually since 1987, without seeing any Black-veined Moths, but in 2000 fresh males were flushed from the grass, one on the first occasion and two a few days later, suggesting they had emerged on site. They are less than a mile from another rough downland site on which a single moth was seen for the first time in 1999. The latter was searched again this year, with negative results. One of the four current colonies is the result of documented colonisation since 1996. Hopefully, the species will persist on this potential fifth site, though we have doubts as to whether the site is big enough to support a self-sustaining population. We await the season of 2001 with great

interest. Suitable chalk grassland swards are being restored on several nearby sites, most under the Countryside Stewardship Scheme and one by the Kent Wildlife Trust, and it is hoped that these might support additional colonies of the moth in due course.

An experiment to investigate larval survival rates in net cages at one of the occupied sites was completed in 2000. This showed that of one hundred eggs placed in one cage, on the grass stems on which they were laid, only two larvae survived to the winter and both had disappeared by the spring. A freshly-mated, fertile female placed in the other cage resulted in three larvae surviving to the winter and these too had disappeared by the spring. This confirms previous observations that larval mortality is frequently high, which is perhaps to be expected because females are capable of laying 250-300 eggs. These results have important implications in trying to decide the numbers of eggs or larvae that might be needed for releases to establish new colonies.

REDDISH BUFF *Acosmetia caliginosa* (Hb.) – The Reddish Buff continues to thrive at its single surviving native locality, on the Isle of Wight, from which it would almost certainly have been lost were it not for the management work carried out over the last decade as part of the English Nature Species Recovery Project. Work continues each winter to clear back or keep in check the scrub, which would otherwise encroach and smother the open heathy swards in which Saw-wort *Serratula tinctoria*, the larval foodplant, grows in abundance. Work continues to extend and restore small patches of adjacent habitat into which the moth can spread. In 2000 the adult moth was seen on a number of occasions by day, in addition to those seen in the light-traps, and its behaviour was filmed for the first time.

Because the moth has been reduced to a single locality in Britain, attempts to establish additional colonies within the former range of the moth are a major part of the Species Recovery Project. Three establishment trials are currently underway, two on the Isle of Wight and one in Hampshire and we have one more site on the island and two more in Hampshire that are ready for releases of larvae or adult moths. Unfortunately, the numbers of larvae produced in captivity in 2000 were insufficient for initiation of new trials or top-up releases. Monitoring suggests that numbers have also dwindled on the establishment sites. Although adults were light-trapped at both establishment sites on the Isle of Wight in 1999, none could be found with a similar level of search effort in 2000. The mainland site has produced a blank result for the second year running, in spite of up to eight light-trapping visits per year and some searches for larvae. It is now fair to assume that the moth has died out at the latter. In spite of some management problems in keeping the sward in ideal condition, there are good reasons for believing that this site can support a population of the Reddish Buff. Initial results during the first two years of this latest release were good, but a series of years of indifferent weather during

the flight period in late May and early June appear to have prevented numbersbuilding up. I believe further releases into more favourable conditions could lead to a successful establishment on this site yet, but with limited supplies of captive larvae, other sites may be trialed first.

BRIGHT WAVE *Idaea ochrata cantiata* Prout – Survey work during the last two years indicates that the Bright Wave is almost certainly confined to a single locality in Britain now. The former sites in Suffolk and Essex have produced negative results for a number of years and must be considered lost. However, the status of the moth at the remaining locality, between Sandwich and Deal in Kent, has proved to be stronger than it appeared before the fieldwork carried out for the UK BAP project. Although recent records of the moth had tended to come from one easily accessible piece of ground, by exploring private land with the owners' permissions, the moth has been confirmed to occur on four different ownerships covering an eight kilometre length of the coast. Within this, the moth occurs in a recognisable type of sward represented extensively in the roughs of the links golf courses in this area. The moth is absent further inland where the sward has been grazed, fertilised and otherwise agriculturally improved and is not common and hardly breeding on the seaward side where the turf gives way to large expanses of bare sand and shingle, though adult moths sometimes wander or are blown into this area. Revealingly, the moth also appears to be absent from parts of a nature reserve where the sward has a promising botanical composition but is heavily grazed during the winter. The larvae overwinter and have been found near the ground on leguminous foodplants, but may be unable to survive the winter if grazing is heavy. Not one of the places where the moth is frequent is grazed.

The adult numbers of the Bright Wave are now monitored by four transect walks, three of which have been set up specifically for the moth in the two years of the BAP project. Numbers seen in 2000 were of the same order as in 1999, so the population may prove to be stable at this site at present. An illustrated leaflet has been prepared and distributed to the site owners, to introduce the moth and explain its habitat requirements. Management plans have been discussed with the owners and will be kept under review for as long as the project lasts.

The search area for undiscovered colonies of the Bright Wave was extended in 2000 and sites considered particularly promising in 1999 were revisited. Particular attention was paid to links golf courses, which the golfers themselves considered similar to the occupied sites. The northernmost visited were Brancaster and Hunstanton on the north coast of Norfolk and Skegness in Lincolnshire, and the southernmost was Rye, Sussex. However, the Bright Wave was seen at none of these, in spite of some good weather for daytime searches. Some of these sites may be considered for establishment trials when they have been sufficiently searched to be sure the moth is not present and

when the appropriate arrangements have been agreed with the landowners. The indications are that establishment trials by translocation of adults may be quite successful, based on results in captivity, and that the numbers of adults at the occupied sites are sufficient to withstand removal of the numbers necessary to initiate trials.

WHITE-SPOTTED PINION *Cosmia diffinis* (L.) – The year 2000 was the first year of work on this moth as part of the UK BAP project. This elm-dependent moth formerly was widely distributed throughout England north to the Mersey, south Cumbria and the Humber, with a scattering of records in Wales. Since the ravages of Dutch elm disease in the 1970s, the moth has undergone a massive decline and now the only part of the country in which it is being found reliably is in Huntingdonshire and Cambridgeshire. Occasional recent records from elsewhere suggest it still survives very locally in other parts of its former distribution, however. More about the moth, its status and techniques for locating it can be found in an article recently published in *Atropos* **10**: 5-9. The aim of the BAP project is to investigate the ecological requirements of the moth and its larvae and to extend the search out from the half dozen known sites to other nearby woods with elm, many of which have never been examined, and to woods further afield. In fact, by kind arrangement with the organisers, National Moth Night for 2001 will be held on 11 August, a date chosen with this moth in mind, and we shall be encouraging participants throughout Britain to set up lights under their local elms. Potentially we could learn a great deal about the current national distribution of this moth from this one night. During 2000, we light-trapped adult moths at all but one of the known sites in Huntingdonshire and in two new sites nearby, but numbers per trap were small in comparison to some recent years. In view of earlier larval work during May and June, this was not a surprise and probably relates to the changeable and often dull wet weather at this time. An important part of the project is to find out the extent to which larvae may be limited to the foliage of epicormic growth (side-shoots) on the trunks of mature trees, as reported in Haggett (1981. *The larvae of British Lepidoptera not illustrated by Buckler*. BENHS). If the moth requires such growth, opportunities in Britain are presently very limited. In recent years, adult moths have occurred in light-traps in Huntingdonshire woods without such elms, suggesting the moth may be less discriminating. However, in 2000 we were unable to find a single larva in the woodland which produces the largest catches of adults, even though searches took place on 22 May, 5 and 10 June and involved several of us beating, both from the ground and up to five metres above it using ladders, as well as searching by hand. What also became apparent was the number of other insects which produce similar spinnings between elm leaves. On 28 May PW found a single young larva, in a spinning on the epicormic growth of tall elms planted as a shelterbelt several trees deep, between a road and a cattle field. This was the only larva found by

the members of the Huntingdonshire Moth and Butterfly Group in 2000 and it later produced a parasitoid. This little wasp has been sent to Mark Shaw in the National Museum of Scotland, for identification. We shall hope for a better larval season in 2001.

FOUR-SPOTTED *Tyta luctuosa* (D.& S.) – The Four-spotted moth appears to require sunny, hot, dry habitats in which the larval foodplant, Field Bindweed *Convolvulus arvensis*, grows through a sparse sward or on almost bare ground. The moth has been in decline since the early 1950s, with evidence of an earlier decline at the end of the nineteenth century, the most probable causes being intensification of agricultural methods and other changes in land management. Climatic deterioration to milder, wetter weather and nitrate deposition from the air have also been implicated, both leading to coarser, more vigorous and cooler swards. Some breeding sites have definitely deteriorated in the last few years as a result of lack of grazing or disturbance, leading to longer grass and scrub encroachment. Recent records suggest the decline is continuing. The former range of the moth extends from the south coast of England to a line running from the Severn to just north of the Wash. Since 1980, the moth has been reported from a variety of locations scattered through this area, and even once from Durham, but almost always as singletons, most frequently in light-traps, but occasionally by day. Usually any colonies from which they might come have not been located. Breeding areas where the moths can be seen reliably and in numbers are now a rarity. The Isle of Portland, Dorset, is the best known and the moth continues to be recorded annually in the light-trap operated by Martin Cade at Portland Bill Bird Observatory, though numbers noted in 2000 were small. An indication that all is not well with the moth on Portland is that relatively few are now seen along the footpaths around the edges of the farm fields near the observatory. When these were farmed for cereal crops until a few years ago, the Bindweed sprawled along the field edges and the moth was frequently seen by day. Recently the farmer has abandoned cereals for cattle, which have grazed the sward flat to the ground in these rather poor fields and the breeding opportunities for the moth are much reduced. PW and Mark Parsons visited the area with Martin on 3 August 2000 as part of a newly begun BAP project on this moth, and familiarised ourselves with the situation. We saw only one moth all day. Significantly it was nectaring at Bindweed flowers in an ungrazed field margin along a fenceline. As it turned out, the emergence of the second generation in 2000 was poor, probably because the development of the first generation was protracted by changeable weather. But even if the weather had been better, it was clear from Martin's recollections that the likely breeding areas are now greatly reduced. We searched other parts of Portland for promising habitat and found a number of likely areas, including one of the Butterfly Conservation nature reserves, and have resolved that these should be inspected during the flight season of the first generation in 2001, when

hopefully there will be a few more moths about by day. Received wisdom has it that the second generation is normally the stronger on Portland, however. We investigated a number of the quarries on the east side of Portland, where the Four-spotted has been seen in the last twenty years, sometimes in numbers. We made the observation that the Field Bindweed is actually very rare in the bottoms of the quarries, where there is virtually no soil. It is often frequent on the lips of the quarries, amidst broken ground and this is presumably where the moth breeds.

During this first year of the Four-spotted project, three other areas of work have begun. The first is the intensive monitoring and study of probably the single largest remaining population of the moth in Britain, at a site near Peterborough. Second, visits have been made to start to document the current condition of the other known breeding areas. Thirdly, efforts to update the national database of records of the Four-spotted and to promote better recording of the moth have been initiated. Illustrated articles are being written to raise interest in the moth. The first of these, in the *British Wildlife* moth report (**11**: 439-440 for August 2000) has resulted in two sites to investigate in 2001 and several recent records of singletons being sent in by readers. Weekly transect counts at the Peterborough site have helped to clarify the best dates to search elsewhere for the moth and demonstrated that the moth fielded only a very partial second generation at this location in 2000. Favoured nectar plants, characteristics of the habitat where the moths were most frequently seen and responses to different weather and survey conditions have all been documented. In the second week in July, just when searches for larvae were about to take place, and captive larvae were nearly fully grown, the main dyke bank, where most adults had been seen, was scraped clear of vegetation by the Environment Agency in a dyke clearance operation. This removed most probably all the larvae from the bank. A few shoots of Field Bindweed remained, on which any fallen larvae could have fed, and after a week or so, new growth of Bindweed was evident. If the scraping had been a fortnight later, after pupation in the soil, the survival of this generation would probably have been much higher. Subsequently only one adult of the second generation was seen, on 28 July. While catastrophic in the short-term, I believe it is the scraping operation which maintains the suitability of the site in the long-term. The sward would otherwise become too rank, as it has on the unscraped side of the dyke. It appears that the moth is able to survive the scraping operation because it also breeds along the top of the bank and by an adjacent railwayline, from which it is able to recolonise the scraped area as the vegetation recovers. Subsequent discussions with the Environment Agency have established that the scrape is annual and takes place any time from July to September. The Environment Agency are happy to wait until August to scrape it in 2001 and this actually suits them better. We propose to monitor the response of the moth population before and after the later scrape next year.

Visits were made to a disused railway cutting in Nottinghamshire which was notified as a SSSI in the late 1980s on account of the population of the Four-spotted moth it supported. The moth appears to have been lost from this site in the last few years, though a small population has since been found a little further up the same line. The vegetation on the site has been allowed to become much more rank than when PW visited it some ten years ago and this year there was standing water in the cutting when PW visited on 28 June. This site would also benefit from scraping of the vegetation from part of the south-facing bank, which last took place over ten years ago.

On 8 August 2000, site visits were also made to four sites in Lincolnshire, from three of which there are recent records of the moth, though the moth probably only breeds at one. This latter was interesting in demonstrating the sort of habitat which possibly supported many colonies of the moth before the last war, but which has all but disappeared now. The site was a steep south-facing calcareous bank, lightly grazed by cattle which were present on the date of the visit. No fertilisers had been applied and a management agreement is in place with English Nature because of botanical interest. Field Bindweed grows as small plants in the majority of paces across the sparse sward on the site, but in much greater quantity just outside the fence. Hopefully the site can be visited at the peak of the first generation in 2001 to measure the densities at which the moth currently occurs on this site.

MARSH MOTH *Athetis pallustris* Hb. – The Marsh moth is best-known as an insect which used to be found in the Huntingdonshire and Cambridgeshire Fens at Wood Walton, Holme and Chippenham, though searches over the last thirty years indicate that it has disappeared from all three, probably as a result both of flooding and the growth of carr woodland. Though called the Marsh Moth, it appears to prefer the drier margins of wet areas which are open but do not have standing water, so it can be squeezed out if the area of wetland or carr woodland increases. The caterpillars feed on the leaves of plantains, Meadowsweet and probably other plants growing in a fairly sparse sward. There are also reliable old records from Cumbria, Yorkshire, Hampshire, Norfolk and Suffolk, and later the moth was discovered in two places on the Lincolnshire coast, where it still survives. The distribution and numbers of caterpillars at one of these Lincolnshire sites have been monitored annually since 1988 using what is known as the "litter-pile" technique, which was developed in the 1930s at Wood Walton Fen and remains the most effective method of monitoring the breeding success of this moth. This involves the site manager leaving small piles of cut vegetation when the sward is cut any time from late July to October. The larvae seem to like the microclimate in such piles and congregate to feed on growing Plantain leaves under the piles. They can be found and counted by lifting and sieving the piles two to three weeks or more after they have been made. I find the almost fully grown caterpillars

are usually near ground level by day. They remain active and feeding on the leaves until at least November. In 2000, the litter-pile technique was tried at the second Lincolnshire site, where the only records of the moth are of occasional adults at light traps over a wide area. The aim was to try and locate the breeding grounds. This year the results were blank, so in 2001 we shall aim to increase the number and distribution of both light-traps and litter-piles to detect the moth.

It is much less well known that the Marsh Moth was recorded in two inland sites in Lincolnshire in the 1970s, though neither appears to have been investigated more recently. As part of the BAP project, light-traps were operated at both on 13 June 2000 and a return visit was made to the most promising one on the milder night of 27 June 2000. No Marsh moth were seen on either occasion, but only one was seen the previous night (12 June) at the best coastal site and it was in very fresh condition, suggesting that the moths flew late this year. Very interestingly, two immaculate Sand Dart were light-trapped on the second visit (27 June). Either these represent a previously undiscovered inland colony or show that moths are wandering from the more typical coastal breeding areas. Parts of the site are sandy, so breeding is a possibility. Significantly, the Sand Dart occurs at both the coastal Marsh moth sites, so could the Marsh moths recorded here in the 1970s have been wanderers likewise? In fact only four moths were captured in the 1970s, all by Rick Pilcher, on 13 and 16 June 1970, 6 June 1971 and either 15 or 17 June 1973, in spite of frequent light-trapping throughout each year at Rick's garden overlooking the marsh. The two species of moth are very different in flight and build, the Sand Dart being powerful and fast, the Marsh Moth rather slow and flappy, so perhaps a less likely candidate for long distance travel. We shall have to wait and see what further light-trapping in 2001 reveals. Unfortunately the local personnel were unable to arrange litter piles for sampling the inland sites in 2000, despite badgering from PW, but have promised to do so in 2001.

I am most grateful for the help and cooperation of a great many organisations and individuals in my work on the UK Biodiversity Action Plan Priority Species projects. The organisations include: the various offices of English Nature, Interreg, the Hampshire & Isle of Wight Wildlife Trust, the Kent Wildlife Trust, Wiltshire Wildlife Trust, the Lincolnshire Wildlife Trust, the Gloucestershire Biodiversity Partnership, Writtle College, Cotswold Water Park, the Environment Agency, Portland Bill Bird Observatory, Sandwich Bay Bird Observatory, the Grimthorpe Estate, the Kentish Stour Countryside Project, Hampshire County Council, the Wight Volunteers and the Huntingdonshire Moth and Butterfly Group. I also thank the various private land owners, our team of captive breeders, and Martin Cade, John Chainey, Barry Dickerson, David Evans, John Greerson, Phil Porter, Mark Shaw, Tony Smith, Mark Tunmore, Claire and Graham Weaver and Allen Williams.– PAUL WARING, 1366 Lincoln Road, Werrington, Peterborough, PE4 6LS (Email: paul_waring@btinternet.com).